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Air Vehicles Directorate completes flight testing

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WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Air Force Research Laboratory engineers, in conjunction with General Dynamics, Boeing and Barron Associates, completed three months of flight testing on an automatic landing system.

The system compensates for control system failures in Reusable Launch Vehicles (RLVs) like the X-40A Space Maneuvering Vehicle (SMV). It uses Integrated Adaptive Guidance and Control (IAG&C) technology that was jointly developed by Air Vehicles Directorate researchers and contractors.

During testing, the Total In-Flight Simulator (TIFS) replicated X-40A flight characteristics for 64 evaluations covering approximately 20 different failure situations. Engineers evaluated the ability to compensate for single or multiple failures including various combinations of locked control surfaces.

In most evaluations, the simulator landed on virtual runways that were located 20 to 1000 feet above ground, without tests taking place on an actual runway.

The flight simulator is a Convair NC-131H aircraft with a research cockpit grafted onto its nose. Onboard-computers run simulation models that give the convair handling characteristics of the X-40A being tested. The X-40A is a small scale version of the X-37 Space Maneuvering Vehicle (SMV) prototype, the current candidate for the first SMV platform. The X-40A is a less expensive, lower risk way to test X-37 concepts.

Replacing conventional space access vehicles with unmanned launched vehicles will greatly reduce the cost of entering earth's orbit. Before the vehicles can be widely used, they will need to be safer and more reliable. To achieve this goal, future RLVs will use autonomous control systems to respond the way a human pilot would to failures, damage, or changing conditions. @